

THAT WHICH IS CLAIMED IS:

1. A pulling grip for installing a pre-connectorized fiber optic cable having a terminated end with fiber optic connectors mounted upon the ends of respective optical fibers, the pulling grip comprising:

a furcation plug attached to the terminated end of a fiber optic cable;

a pulling grip housing for receiving and temporarily storing the furcation plug, the fiber optic connectors and the ends of the respective optical fibers; and

a pulling grip sleeve comprising a bag that is adapted to be opened to position the pulling grip sleeve over the pulling grip housing and the furcation plug and to be closed around the pulling grip housing and the furcation plug to install the fiber optic cable;

wherein the pulling grip sleeve is removable from the fiber optic cable once the fiber optic cable is installed.

2. A pulling grip according to claim 1 wherein the bag of the pulling grip sleeve is provided with an opening at one end and a handle at the opposite end and wherein the bag defines a lengthwise slit extending from the opening in the direction of the handle.

3. A pulling grip according to claim 2 wherein the slit is adapted to be opened and closed by a zipper extending lengthwise from the opening substantially to the handle.

4. A pulling grip according to claim 1 wherein the pulling grip housing has a first housing portion that defines an elongate channel for routing the optical fibers and a second housing portion that defines a plurality of pockets that each store a plurality of the fiber optic connectors.

5. A pulling grip according to claim 4 wherein the plurality of fiber optic connectors stored within each pocket defined by the second housing portion are bundled together and encompassed by a cylindrical wrap.

6. A pulling grip according to claim 5 wherein the wrap comprises a generally planar sheet of flexible material having opposed ends and wherein the wrap is wrapped around the plurality of fiber optic connectors and the opposed ends are secured together to define a hollow cylinder.

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7. A pulling grip according to claim 6 wherein one of the first housing portion and the second housing portion has a lengthwise groove and the other comprises a lengthwise tongue that engages the groove to thereby secure the first housing portion and the second housing portion together in a closed configuration.

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8. A pulling grip according to claim 1 wherein the furcation plug comprises means for integrating the furcation plug with conventional communications hardware.

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9. A pulling grip according to claim 1 wherein the furcation plug comprises at least one groove and wherein at least one of the first housing portion and the second housing portion comprises a corresponding ridge for engaging the groove to restrain lengthwise movement and rotation of the furcation plug relative to the pulling grip housing.

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10. A pulling grip for installing a pre-connectorized fiber optic cable having a terminated end with fiber optic connectors mounted upon the ends of respective optical fibers, the pulling grip comprising:

a furcation plug attached to the terminated end of a fiber optic cable;

a pulling grip housing for receiving and temporarily encasing the fiber optic connectors, the optical fibers and at least a portion of the furcation plug, the pulling grip housing having a first housing portion defining an elongate channel for routing the optical fibers and a second housing portion defining a plurality of pockets, each pocket for storing a plurality of the fiber optic connectors; and

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a pulling grip sleeve adapted to be positioned over the pulling grip housing and at least a portion of the furcation plug.

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11. A pulling grip according to claim 10 wherein the pulling grip housing is formed by a molded clamshell defining a hinge line that separates the first housing portion and the second housing portion and wherein the first housing portion and the second housing portion are folded about the hinge line to temporarily encase the fiber optic connectors, the optical fibers and at least a portion the furcation plug.

12. A pulling grip according to claim 11 wherein one of the first housing portion and the second housing portion has a lengthwise groove and the other comprises a lengthwise tongue that engages the groove to thereby secure the first housing portion and the second housing portion together in a closed configuration.

13. A pulling grip according to claim 10 wherein the first housing portion comprises a continuous first flange and a plurality of discontinuous second flanges and wherein the optical fibers are routed lengthwise underneath the first flange and between a pair of adjacent second flanges into one of the pockets.

14. A pulling grip according to claim 10 wherein the furcation plug comprises at least one groove and wherein at least one of the first housing portion and the second housing portion comprises a corresponding ridge for engaging the groove to restrain lengthwise movement and rotation of the furcation plug relative to the pulling grip housing.

15. A pulling grip according to claim 10 wherein the pulling grip housing is formed by a plurality of individual modules connected together by at least one flexible rod that is received within a lengthwise opening provided in one of the first housing portion and the second housing portion.

16. A pulling grip according to claim 15 wherein the plurality of modules comprise a plug end module, one or more connector modules, and a nose end module.

17. A pulling grip according to claim 15 wherein each of the plurality of modules has a lengthwise slot and comprises a lengthwise dove tail that engages the slot to thereby

secure the first housing portion and the second housing portion together in a closed configuration.

5 18. A pulling grip according to claim 15 wherein each of the plurality of modules is injection molded.

19. A pulling grip for installing a pre-connectorized fiber optic cable having a terminated end with fiber optic connectors mounted upon the ends of respective optical fibers, the pulling grip comprising:

10 a furcation plug attached to the terminated end of a fiber optic cable;
a pulling grip housing for receiving and temporarily encasing the fiber optic connectors, the optical fibers and at least a portion of the furcation plug; and
a pulling grip sleeve adapted to be positioned over the pulling grip housing and at least a portion of the furcation plug;
15 wherein the pulling grip housing is formed by a plurality of individual modules connected together by at least one flexible rod.

20. A pulling grip according to claim 19 wherein the plurality of modules comprise a plug end module, one or more connector modules, and a nose end module.

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21. A pulling grip according to claim 19 wherein the pulling grip housing has a first housing portion defining an elongate channel for routing the optical fibers and a second housing portion defining at least one pocket for storing a plurality of the fiber optic connectors.

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22. A furcation plug for attachment to a terminated end of a fiber optic cable having at least one fiber optic connector mounted upon the end of a respective optical fiber, the furcation plug comprising:

30 an elongate, tubular epoxy shell for receiving the terminated end of the fiber optic cable, the epoxy shell comprising means for securing the terminated end of the fiber optic

cable and at least a portion of the optical fiber within the epoxy shell and means for integrating the furcation plug with conventional communication hardware.

5 23. A furcation plug according to claim 22 wherein the means for integrating comprises at least one groove formed on the exterior surface of the epoxy shell that is adapted to engage a flange on a mounting bracket provided on the communications hardware.

10 24. A furcation plug according to claim 22 wherein the means for integrating comprises at least one lengthwise channel formed on the exterior surface of the epoxy shell that is adapted to engage at least one mounting stud provided on the communications hardware.

15 25. A furcation plug according to claim 22 wherein the means for integrating comprises at least one ear on the exterior surface of the epoxy shell having an opening that is adapted to receive at least one mounting fastener provided on the communication hardware.

20 26. A furcation plug according to claim 22 further comprising
 a tubular back nut that is positioned on the fiber optic cable and secured to the epoxy shell; and
 a tubular bushing having a conical shape that is positioned on the fiber optic cable and retained by the back nut.

25 27. A furcation plug according to claim 26 wherein the back nut comprises a shoulder and the bushing comprises a radially extending flange that engages the shoulder to retain the bushing on the back nut.

30 28. A furcation plug according to claim 26 further comprising a heat shrink made of a heat-deformable material that transitions between the exterior surface of the epoxy shell and the fiber optic cable.

29. A furcation plug according to claim 22 wherein the fiber optic cable comprises a plurality of fiber ribbons and further comprising a transition element positioned within the epoxy shell beyond the terminated end of the fiber optic cable and adapted to separate the plurality of fiber ribbons.

30. A furcation plug according to claim 29 further comprising a tubular transition sleeve positioned between the epoxy shell and the transition element, the interior surface of the transition sleeve comprising a first surface that cooperates with a second surface provided on the exterior surface of the transition element to prevent rotation of the transition element relative to the transition sleeve.

31. A method for installing a pre-connectorized fiber optic cable having a terminated end with at least one fiber optic connector mounted upon the end of a respective optical fiber, the method comprising:

providing a furcation plug attached to the terminated end of the fiber optic cable;
providing a pulling grip housing for receiving and temporarily encasing the fiber optic connectors, the optical fibers and at least a portion of the furcation plug;

providing a pulling grip sleeve that is adapted to be opened and closed;
positioning the opened pulling grip sleeve over the pulling grip housing and the furcation plug;

closing the pulling grip sleeve around the pulling grip housing and the furcation plug;

pulling the pulling grip sleeve through a small diameter conduit or under the raised floor of a data center;

removing the pulling grip sleeve from the pulling grip housing, the furcation plug and the fiber optic cable after the fiber optic cable is installed; and

removing the furcation plug and the fiber optic connectors from the pulling grip housing.

32. A method according to claim 31 wherein the pulling grip sleeve comprises a bag defining a lengthwise slit and having an opening at one end of the slit and a handle adjacent the other end of the slit and wherein closing the pulling grip sleeve comprises closing the slit defined by the bag from the handle in the direction of the opening.

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33. A method according to claim 32 wherein closing the slit comprises providing a zipper that is extended in the direction of the handle to open the bag and is retracted in the direction of the opening to close the bag.

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34. A method according to claim 31 further comprising providing the pulling grip housing with a first housing portion defining an elongate channel for routing the optical fibers and a second housing portion defining a plurality of pockets for storing the fiber optic connectors, the pulling grip housing defining a hinge line separating the first housing portion and the second housing portion; and

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folding the first housing portion and the second housing portion together to temporarily encase the fiber optic connectors and the optical fibers within the pulling grip housing.

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35. A method according to claim 34 wherein the first housing portion comprises a continuous first flange and at least two discontinuous second flanges and wherein routing the optical fibers comprises routing the optical fibers underneath the first flange and the second flanges.

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36. A method according to claim 34 wherein the fiber optic connectors stored in the pocket are bundled together and encompassed by a cylindrical wrap.

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37. A method for loading a pulling grip with fiber optic connectors mounted upon the ends of respective optical fibers of a pre-connectorized fiber optic cable having a terminated end, the method comprising:

providing a pulling grip housing having a first housing portion defining an elongate channel for routing the optical fibers and a second housing portion defining a plurality of pockets for storing the fiber optic connectors;

5 routing the optical fibers lengthwise from the terminated end of the fiber optic cable within the channel and into one of the pockets such that the pocket stores a plurality of the fiber optic connectors.

38. A method according to claim 37 further comprising
10 providing the pulling grip housing with a hinge line separating the first housing portion and the second housing portion; and
folding the first housing portion and the second housing portion together to encase the fiber optic connectors and the optical fibers within the pulling grip housing.

39. A method according to claim 38 wherein the first housing portion comprises a
15 continuous first flange and at least two discontinuous second flanges and wherein routing the optical fibers further comprises routing the optical fibers underneath the first flange and the second flanges.

40. A method according to claim 37 wherein the plurality of fiber optic connectors
20 stored in the pocket are bundled together and encompassed by a cylindrical wrap.

41. A method according to claim 37 further comprising a pulling grip sleeve and a
furcation plug attached to the terminated end of the fiber optic cable and received within
the pulling grip housing and further comprising positioning the pulling grip sleeve over
25 the pulling grip housing and the furcation plug.

42. A method according to claim 41 wherein the pulling grip sleeve comprises a bag
adapted to be opened and closed and wherein positioning the pulling grip sleeve further
comprises opening the bag to position the pulling grip sleeve over the pulling grip
30 housing and the furcation plug and subsequently closing the bag around the pulling grip housing and the furcation plug.